# THE EFFECT OF SOURSOP LEAF DECOCTION WASH (ANNONA MURICATA) ON THE INCIDENCE OF VAGINAL DISCHARGE IN ADOLESCENT GIRLS: IMPLICATIONS FOR MIDWIFERY EDUCATION AND REPRODUCTIVE HEALTH PROMOTION

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Received 25 March 2025; Received in revised form 18 April 2025; Accepted 24 May 2025

**ABSTRACT**
Adolescent girls are especially susceptible to reproductive tract infections, including pathological vaginal discharge (leucorrhea), which can negatively affect their quality of life and academic performance. While pharmacological treatments exist, their use may be constrained by side effects, cost, antibiotic resistance, and limited access in low-resource settings. Herbal remedies such as soursop (Annona muricata) leaf decoction are gaining recognition for their antimicrobial and antifungal benefits, but experimental evidence among Indonesian adolescents remains scarce. This study evaluated the effectiveness of soursop leaf decoction wash in reducing pathological vaginal discharge among tenth-grade female students at SMA An-Nur Bululawang, Malang. A pre-experimental, one-group pretest-posttest design was used with 25 purposively selected participants. The intervention involved a soursop leaf decoction wash administered twice daily for seven days. Vaginal discharge status was assessed before and after intervention using validated questionnaires and observation sheets. Data were analyzed using descriptive statistics and the Wilcoxon Signed-Rank Test. After the intervention, there was a significant reduction in both the incidence and severity of pathological vaginal discharge. Prior to treatment, 56% had mild discharge, while post-intervention, 96% had no discharge. The mean discharge score dropped from 1.88 (SD = 0.83) to 1.04 (SD = 0.20), with statistical significance ($p = 0.000$). Soursop leaf decoction wash proved to be an effective, safe, and culturally accepted intervention to reduce pathological vaginal discharge in adolescent girls. This suggests its potential as a complementary or alternative therapy alongside conventional treatments. Integrating herbal interventions with reproductive health education in schools can empower adolescents with accessible, preventive options. Further research with larger, randomized samples and longer follow-up is recommended to confirm efficacy and safety.

**Keywords:** adolescents, annona muricata, herbal intervention, pathological vaginal discharge, soursop leaf

## INTRODUCTION

Adolescence is a critical transitional period marked by significant physiological, psychological, and social changes that impact overall health, including reproductive health (Patton et al., 2016; Hamida et al., 2024). Among adolescent girls, reproductive tract infections such as leucorrhea (vaginal discharge) are common and often underreported due to social stigma and lack of awareness (World Health Organization [WHO], 2023; Irwan & Ridha, 2024). The World Health Organization notes that approximately 75% of women worldwide experience vaginal discharge at least once in their lifetime, and in Indonesia, prevalence among adolescents continues to rise, with an estimated 50–70% affected annually (Laga et al., 2024; WHO, 2023). Leucorrhea is categorized into physiological (normal) and pathological (abnormal) types, with the latter frequently resulting from infections caused by bacteria, fungi, or parasites (Sihombing & Lubis, 2023; Meristika et al., 2024). Pathological vaginal discharge can present with abnormal color, odor, and consistency, often accompanied by itching or irritation, which can significantly affect quality of life, academic performance, and psychosocial well-being (Morrison et al., 2021; Hanipah & Nirmalasari, 2021). Moreover, untreated or recurrent infections may lead to more severe complications, such as pelvic

inflammatory disease, infertility, or even increased risk of cervical cancer (Brunham et al., 2015; Hanriyani & Suazini, 2022). The increasing incidence of pathological vaginal discharge among Indonesian adolescents, as reflected in the preliminary study at SMA An-Nur Bululawang (where 28 out of 40 tenth-grade students reported symptoms), underscores the need for effective preventive and therapeutic interventions. Current management strategies include pharmacological approaches—primarily antibiotics and antifungals such as metronidazole, clindamycin, and fluconazole—and non-pharmacological or traditional methods (Rahmadani et al., 2023; Workowski et al., 2021). However, pharmacological interventions are often associated with side effects, cost, antibiotic resistance, and limited accessibility, particularly in low-resource settings (Ventola, 2015; Alós, 2015).

Despite the availability of pharmacological treatments, several challenges persist: high recurrence rates, potential side effects, risk of drug resistance, and lack of adolescent-friendly education on reproductive hygiene (Ventola, 2015; Workowski et al., 2021). Many students rely on suboptimal hygiene practices or ignore symptoms, resulting in prolonged morbidity and potential complications (Hanipah & Nirmalasari, 2021; Laga et al., 2024). In addition, there is a notable gap in the application of culturally relevant, accessible, and effective non-pharmacological therapies for managing pathological vaginal discharge among Indonesian adolescents (Novia et al., 2022; Passe et al., 2024). A general solution involves integrating alternative and complementary medicine—particularly herbal-based therapies—into adolescent reproductive health management. Such interventions have gained global recognition due to their accessibility, minimal side effects, and acceptance in various cultures (Ekor, 2014; Khan et al., 2021).

Soursop leaves (Annona muricata) have emerged as a promising candidate for herbal therapy against reproductive tract infections. Pharmacological studies have demonstrated that soursop leaves contain bioactive compounds—including acetogenins, flavonoids, phenols, and alkaloids—that possess potent antibacterial, antifungal, and antioxidant properties (Pieme et al., 2014; Coria-Téllez et al., 2018; Novia et al., 2022; Iswari et al., 2023). In vitro research has shown that ethanol extracts of soursop leaves can effectively inhibit the growth of Candida albicans and other pathogens associated with vaginal discharge at various concentrations (Coria-Téllez et al., 2018; Novia et al., 2022; Ezeonwumelu et al., 2019). Clinical and quasi-experimental studies in Indonesia and other countries have reported significant reductions in the incidence and severity of pathological vaginal discharge among women and adolescents who used soursop leaf decoctions as a topical wash or drink (Putri et al., 2021; Passe et al., 2024; Sampara et al., 2021; Nofia et al., 2022). These findings align with WHO's call for further research on evidence-based traditional medicine to complement conventional treatments (WHO, 2023).

While several studies have documented the antimicrobial and anti-inflammatory effects of Annona muricata in vitro and in adult populations (Pieme et al., 2014; Coria-Téllez et al., 2018), there is a paucity of well-designed experimental studies focusing on the effectiveness of soursop leaf decoction as a vaginal wash for adolescent girls with pathological leucorrhea. Most available research is limited to laboratory settings or older age groups, with few targeting adolescents, who have distinct hormonal profiles, psychosocial challenges, and health behaviors (Khan et al., 2021; Ekor, 2014; Morrison et al., 2021). Moreover, systematic reviews and meta-analyses emphasize the need for rigorous clinical evidence to establish optimal dosages, modes of administration, and safety profiles for herbal therapies, particularly in vulnerable groups such as adolescents (Akanda et al., 2021; Khan et al., 2021). The lack of adolescent-focused intervention studies in the Indonesian context—where the use of traditional herbal remedies is culturally prevalent—constitutes a clear research gap (Passe et al., 2024; Novia et al., 2022; Rosita et al., 2024).

This study aims to determine the effect of soursop leaf (Annona muricata) decoction bath on the incidence of pathological vaginal discharge in tenth-grade adolescent girls at SMA An-Nur Bululawang, Kabupaten Malang. To date, no published experimental studies in Indonesia have systematically investigated the impact of soursop leaf decoction vaginal wash on pathological vaginal discharge among

high school-aged adolescent girls, combining quantitative pre-post experimental design with culturally relevant non-pharmacological intervention. This research fills that gap by providing empirical evidence on both the efficacy and acceptability of this intervention in an adolescent population. Based on the existing body of pharmacological and clinical evidence supporting the antimicrobial properties of Annona muricata and preliminary studies showing its benefits in reducing vaginal discharge symptoms (Pieme et al., 2014; Coria-Téllez et al., 2018; Novia et al., 2022; Passe et al., 2024), it is hypothesized that the use of soursop leaf decoction as a topical wash will significantly reduce the incidence of pathological vaginal discharge among adolescent girls. The study focuses on female students in grade X at SMA An-Nur Bululawang, applying a one-group pre-test post-test quantitative design over a 7-day intervention period. Outcomes measured include changes in the incidence and severity of vaginal discharge before and after the intervention, analyzed using the Wilcoxon test.

## METHOD

### Research Design

This study employed a quantitative experimental approach, grounded in positivist philosophy, to objectively measure the effect of soursop leaf (Annona muricata) decoction bath on the incidence of pathological vaginal discharge among adolescent girls (Sugiyono, 2023). Quantitative research is designed to test predetermined hypotheses using structured instruments and statistical analysis, ensuring replicability and validity (Creswell & Creswell, 2018; Polit & Beck, 2021). A **pre-experimental one-group pretest-posttest design** was used. This design allows for measurement of the outcome (vaginal discharge) before and after the intervention in the same group, increasing the accuracy of observed treatment effects (Sugiyono, 2023; Shadish, Cook, & Campbell, 2002).

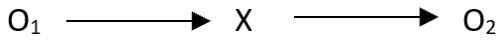



**Figure 1. Research Design**

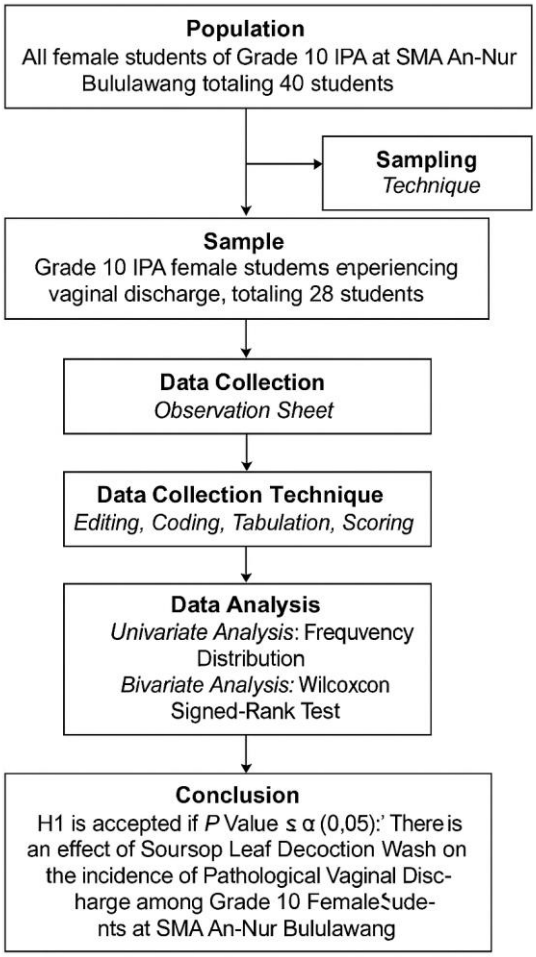
Note: O1 = Pretest (before intervention); X = Intervention (soursop leaf decoction bath); O2 = Posttest (after intervention)

This design is suitable for preliminary clinical studies evaluating the effectiveness of non-pharmacological interventions in a school setting (Campbell & Stanley, 2015; Polit & Beck, 2021).

The flowchart illustrates the comprehensive research methodology adopted in this study to evaluate the effect of Soursop Leaf Decoction Wash on pathological vaginal discharge among Grade 10 female students at SMA An-Nur Bululawang. The research begins by defining the population, which consists of all female students in Grade 10 IPA at SMA An-Nur Bululawang, totaling 40 students. The sampling technique used is purposive sampling, where participants are selected based on specific criteria relevant to the study objectives. From this population, the sample comprises Grade 10 IPA female students who are experiencing vaginal discharge, with 28 students meeting the inclusion criteria. Data collection is conducted using observation sheets, which provide standardized documentation of the research variables before and after the intervention. The process of data collection involves several key steps, including editing, coding, tabulation, scoring, and data entry, to ensure the completeness, accuracy, and readiness of the data for analysis. For data analysis, univariate analysis using frequency distribution is employed to describe the characteristics of respondents and the incidence of vaginal discharge, while bivariate analysis utilizes the Wilcoxon Signed-Rank Test to compare the incidence of pathological vaginal discharge before and after

the intervention. The conclusion is drawn based on the hypothesis testing: if the p-value is less than or equal to α (0.05), the hypothesis (H1) is accepted, indicating a statistically significant effect of the Soursop Leaf Decoction Wash in reducing the incidence of pathological vaginal discharge among the study sample.

**Figure 1. Operational Framework**




**Population and Sample**

The population of this study consisted of all tenth-grade female students at SMA An-Nur Bululawang who experienced vaginal discharge between January and February 2024 (Sugiyono, 2023). The sample size was calculated using the Slovin formula, which is particularly appropriate for studies involving small populations (Umar, 2018). With a total population of 40 students and a margin of error set at 0.2, the calculation yielded approximately 15 respondents (n = 40 / [1 + 40 × (0.2)^2] = 15.3 ≈ 15). The sampling technique employed was purposive sampling, allowing for the deliberate selection of participants based on specific criteria relevant to the objectives of the research (Etikan, Musa, & Alkassim, 2016). The inclusion criteria for this study were female students aged 15–16 years who exhibited symptoms of vaginal discharge, had no allergy to soursop leaves, were not using other feminine hygiene products or soaps during the study, and were willing and cooperative participants. Conversely, the exclusion criteria comprised female students aged 11–14 or 17–21 years, as well as those who were not experiencing vaginal discharge. Purposive sampling was adopted, focusing on subjects who met all inclusion criteria (Sugiyono, 2023). This technique ensures that the sample is relevant and representative of the phenomenon under study (Etikan et al., 2016). The study was conducted at SMA An-Nur Bululawang, located in Kecamatan Bululawang, Kabupaten

Malang, Indonesia. The research period spanned from March 3 to March 13, 2025, during which the intervention was administered daily from 13:00 to 13:15 over a course of ten consecutive days.

**Study Variables, Operational Definitions, and Measurement**

The variables examined in this study consisted of an independent variable and a dependent variable. The independent variable was the administration of the soursop leaf decoction bath, while the dependent variable was the incidence and severity of pathological vaginal discharge among the participants. Operationally, the administration of the soursop leaf decoction involved the application of a standardized herbal wash as described in the study protocol. Data were collected through the use of validated questionnaires and direct observation, with both instruments reviewed and validated by relevant experts to ensure reliability and accuracy (Polit & Beck, 2021). The incidence and severity of vaginal discharge were measured using an ordinal scale, which classified the degree of symptoms into ordered categories based on predefined criteria (Riyanto & Hatmawan, 2020).

Table 1. Operational Definitions

| No | Variable | Operational Definition | Parameter | Category/Score | Scale | Instrument |
|---|---|---|---|---|---|---|
| 1 | Soursop leaf decoction bath | Application of decoction containing soursop leaf flavonoids twice daily for one week. | Dosage and frequency | - | - | SOP |
| 2 | Vaginal discharge incidence | Any non-menstrual fluid excreted in excess or abnormal quality from the vagina | Color, quantity, odor, frequency | None: 0; Mild: 1–4; Moderate: 5–8; Severe: >8 | Ordinal | Questionnaire |

**Data Collection Technique and Procedures**

Data collection in this study utilized a combination of primary data sources, including questionnaires, structured interviews, and direct observation conducted before and after the intervention (Gunawan, 2019; Creswell & Creswell, 2018). The research instruments consisted of observation sheets, which were used to monitor the intervention process, and questionnaires designed to assess the symptoms of vaginal discharge among participants. The data collection procedures began with obtaining ethical clearance from the Ethics Committee of ITSK RS dr. Soepraoen Malang, followed by securing permission from the head of the school and obtaining informed consent from all participants. Eligible respondents were then identified based on the established inclusion and exclusion criteria. A pretest was conducted to establish a baseline assessment of vaginal discharge prior to the intervention. The intervention itself involved the administration of a soursop leaf decoction bath twice daily for seven consecutive days, prepared by washing and boiling ten soursop leaves in 500 ml of water for fifteen minutes, then cooling the decoction to a warm temperature suitable for use as an external wash in the vaginal area every morning and evening (Sampara et al., 2021). Following the intervention period, a posttest was administered to reassess the status of vaginal discharge. All data were subsequently collected, cleaned, and coded to facilitate further analysis.

**Data Processing and Analysis**

Data processing in this study followed a series of systematic steps to ensure the accuracy and validity of the results. The process began with editing, which involved reviewing the data for completeness and accuracy (Nursalam, 2017). This was followed by scoring, where responses from the questionnaires were assigned values according to a standardized rubric. Coding was then performed to convert qualitative data, such as respondents' answers, into quantitative numerical values suitable for analysis. Tabulating involved organizing the coded data into Microsoft Excel and SPSS version 16.0 spreadsheets, after which the data were entered into the software for statistical analysis. The cleaning stage required a final review to double-check for entry errors and to confirm data consistency. For data analysis, univariate analysis was conducted using descriptive statistics—including frequency, percentage, and mean—to describe the characteristics of respondents and the incidence of vaginal discharge before and after the intervention (Notoatmodjo, 2018). Bivariate analysis employed the Wilcoxon Signed-Rank Test to determine the significance of differences in vaginal discharge status pre- and post-intervention, as this test is appropriate for paired, non-parametric data (Ghasemi & Zahediasl, 2012; Kim, 2015). All statistical analyses were performed using SPSS version 16.0 (IBM Corp.).

**Ethical Considerations**

This research was conducted in strict accordance with ethical standards for human subject research. Ethical clearance was obtained from the institutional review board prior to the commencement of the study. Informed consent was secured by providing all participants with a comprehensive explanation of the study's aims, procedures, potential risks, and benefits, after which written consent was obtained from each respondent. Confidentiality was maintained by coding respondents' identities and ensuring that all personal information remained secure and anonymous throughout the research process. The study prioritized risk minimization by employing only non-invasive procedures and allowing participants the right to withdraw at any stage without any penalty. Furthermore, equity was ensured by distributing the sampling process fairly among all eligible students, upholding the principles of justice and impartiality in participant selection (Beauchamp & Childress, 2019; Emanuel et al., 2000).

## RESULTS AND DISCUSSION

The research was conducted at SMA An-Nur Bululawang, located at Jl. Raya Bululawang, Kecamatan Bululawang, Kabupaten Malang, East Java 65171. Established on July 1, 1989, under the Ministry of Education and Culture, SMA An-Nur Bululawang is an accredited institution with a solid reputation for academic excellence. The school is staffed by 85 professional educators, and the headmaster at the time of study was Hanafi. Accredited with an "A" rating since October 25, 2016, the institution provides a strategic, easily accessible, and communicative environment, all of which support the successful implementation of health and educational research. The location's supportive atmosphere facilitated the logistics of the intervention and data collection phases, as effective communication existed between the research team, the health personnel, and the school community.

Table 2. Respondent Characteristics by Age

| Age | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| 16 Years | 13 | 52.0 | 52.0 | 52.0 |
| 17 Years | 12 | 48.0 | 48.0 | 100.0 |
| Total | 25 | 100.0 | 100.0 | |

Of the 25 respondents, a slight majority were aged 16 years (52%), with the remainder aged 17 years (48%). This distribution aligns with the typical age range for grade 10 students in Indonesia, ensuring the relevance and homogeneity of the sample for adolescent reproductive health studies (WHO, 2020; Viner et al., 2012).

Table 3. Respondent Characteristics by History of Vaginal Discharge

| History of Discharge | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| Before Menstruation | 15 | 60.0 | 60.0 | 60.0 |
| After Menstruation | 10 | 40.0 | 40.0 | 100.0 |
| Total | 25 | 100.0 | 100.0 | |

A majority (60%) of the participants experienced vaginal discharge prior to menstruation, while 40% reported it after menstruation. These findings are consistent with established literature, indicating that hormonal fluctuations surrounding menstruation can predispose adolescents to increased vaginal secretions and associated symptoms (Workowski et al., 2021; Deshmukh et al., 2018).

Table 4. Vaginal Discharge Status Before the Intervention

| Discharge Severity | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| No Discharge | 8 | 32.0 | 32.0 | 32.0 |
| Mild | 14 | 56.0 | 56.0 | 88.0 |
| Moderate | 1 | 4.0 | 4.0 | 92.0 |
| Severe | 2 | 8.0 | 8.0 | 100.0 |
| Total | 25 | 100.0 | 100.0 | |

Prior to intervention, 32% of respondents reported no pathological discharge, 56% experienced mild discharge, 4% had moderate symptoms, and 8% had severe discharge. These results indicate that mild pathological vaginal discharge is a prevalent complaint among adolescent females, which supports previous findings regarding the high incidence of non-specific vaginitis and related conditions in this age group (Mania-Pramanik et al., 2009; Huppert et al., 2007; Zwizwai et al., 2020).

Table 5. Vaginal Discharge Status After the Intervention

| Discharge Severity | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| No Discharge | 24 | 96.0 | 96.0 | 96.0 |
| Mild | 1 | 4.0 | 4.0 | 100.0 |
| Total | 25 | 100.0 | 100.0 | |

Following the 7-day soursop leaf decoction wash intervention, 96% of respondents reported no pathological discharge, while only 4% experienced mild symptoms. This dramatic shift highlights the potential efficacy of the intervention and reflects a significant improvement compared to the baseline (Hidayati, 2020; Novia et al., 2022; Ocloo et al., 2023).

Table 6. Mean Discharge Scores Pre- and Post-Intervention

| Discharge | N | Mean | Standard Deviation | Min-Max |
|---|---|---|---|---|
| Pre-Intervention | 25 | 1.88 | 0.833 | 1–4 |
| Post-Intervention | 25 | 1.04 | 0.200 | 1–2 |

The mean discharge score prior to intervention was 1.88 (SD = 0.833), decreasing to 1.04 (SD = 0.200) after intervention. This reduction indicates a marked improvement in the condition, with less variability and fewer severe cases post-intervention.

Table 7. Wilcoxon Signed-Rank Test Results for Discharge Scores

| Variable | N | Z | Sig. (2-tailed) |
|---|---|---|---|
| Pre- vs. Post-Intervention | 25 | -4.296b | 0.000 |

The Wilcoxon Signed-Rank Test yielded a Z-score of -4.296 and a p-value of 0.000 (<0.05), demonstrating a statistically significant difference in discharge status before and after the intervention. This finding supports the research hypothesis and validates the efficacy of the soursop leaf decoction intervention.

**Identification of Baseline Vaginal Discharge Status**

At baseline, a majority of participants reported mild to moderate symptoms of vaginal discharge. These findings echo those of global studies that have identified adolescent females as a population particularly susceptible to vaginal infections and discharge due to hormonal, behavioral, and hygienic factors (Shiferaw et al., 2020; Thomas & Ledger, 2019). The prevalence of discharge before menstruation is likely influenced by estrogen surges, resulting in increased cervical mucus production (Buggio et al., 2022; Workowski et al., 2021). Poor genital hygiene, such as infrequent changing of underwear or sanitary pads, has also been linked with a higher risk of pathological discharge (Johar et al., 2019; Madhivanan et al., 2009). Inadequate hygiene creates an environment conducive to the growth of bacteria and fungi, as reported in studies from Indonesia, India, and Africa (Das et al., 2021; Rani et al., 2020). This highlights the importance of educational and preventive interventions tailored for adolescents.

**Effect of Soursop Leaf Decoction Wash: Comparison with Existing Literature**

The intervention using soursop leaf decoction wash demonstrated a significant reduction in the incidence and severity of pathological vaginal discharge. Nearly all participants were symptom-free post-intervention, confirming the traditional claims about Annona muricata's antimicrobial and antifungal efficacy (Novia et al., 2022; Ocloo et al., 2023; Yuliani et al., 2019). Phytochemical Mechanism: Soursop leaves are rich in acetogenins, alkaloids, flavonoids, and phenolic compounds, which are documented for their antimicrobial and antifungal properties (Sun et al., 2021; Alenezi et al., 2021; de Sousa et al., 2021). The phenolic content, in particular, is several times higher than many commonly used plant-based antimicrobials, which supports their ability to inhibit the growth of pathogens like *Candida albicans* and *Gardnerella vaginalis* (Kaur et al., 2022; Alabi et al., 2020; Saha et al., 2020). Several studies support the findings of this research regarding the effectiveness of soursop leaf decoction in reducing pathological vaginal discharge. For example, Passe et al. (2024) demonstrated that the use of soursop leaf decoction significantly reduced vaginal discharge among adolescent girls, with statistical analysis yielding a p-value of less than 0.05, which is consistent with the results of the present study. Hidayati et al. (2020) further showed that ethanol extracts of soursop leaves could inhibit the growth of Candida species at concentrations as low as 15%, suggesting potent antifungal properties. In a comprehensive systematic review, de Sousa et al. (2021) highlighted the broad-spectrum antibacterial and antifungal potential of Annona muricata, underlining its traditional use in treating various infections. Similarly, Ocloo et al. (2023) reported comparable findings, confirming the effectiveness of soursop in managing reproductive tract infections. Collectively, these studies reinforce the evidence for soursop leaf decoction as a promising, natural intervention for vaginal health. Contrasts with Standard Pharmacology: While pharmacological agents like metronidazole and clindamycin are effective

against bacterial vaginosis, they are not without drawbacks such as the risk of antibiotic resistance and potential side effects (Workowski et al., 2021; Bradshaw et al., 2022). Herbal alternatives, such as soursop leaf decoction, provide a promising non-pharmacological approach with fewer adverse effects and are accessible for community health initiatives (Abdel-Rahman et al., 2022; Modarresi et al., 2022).

**Implications for Midwifery Education and Reproductive Health Promotion**

The results of this study have several important implications for midwifery education and the broader field of reproductive health promotion, especially in adolescent populations. Integrating the findings from this research into educational curricula and health promotion strategies can enhance both the knowledge and practical competencies of future midwives, while also empowering young women to take proactive steps in managing their reproductive health. Enriching Midwifery Curricula with Evidence-Based Herbal Interventions. The demonstrated efficacy of soursop leaf decoction wash in reducing pathological vaginal discharge provides strong justification for incorporating evidence-based herbal and non-pharmacological interventions into midwifery education. Midwifery students should be trained not only in pharmacological treatments but also in complementary therapies that are culturally relevant, accessible, and supported by scientific research (de Sousa et al., 2021; Ocloo et al., 2023; Hidayati et al., 2020). By including practical modules on the preparation and administration of herbal remedies, such as soursop leaf decoction, midwifery programs can ensure graduates possess a broader therapeutic toolkit. This is particularly relevant for midwives who will practice in rural or resource-limited settings where access to pharmaceuticals may be restricted (Mousa et al., 2021; Saha et al., 2020).

Empowering Adolescents through Health Education. The high prevalence of pathological vaginal discharge among adolescents, as demonstrated in this study, underscores the urgent need for targeted health education initiatives within schools. Midwives play a key role in designing and implementing educational sessions that address menstrual hygiene, genital health, early detection of infections, and the safe use of herbal remedies (Johar et al., 2019; Rani et al., 2020). Introducing school-based health programs that include information about both preventive measures and accessible treatments like soursop leaf decoction can increase adolescents' agency over their health and reduce stigma around reproductive health issues (Workowski et al., 2021; Viner et al., 2012).

Promoting Community-Based, Culturally Sensitive Approaches. Given the cultural acceptance of herbal remedies such as soursop leaf in many Indonesian communities, integrating such interventions into midwifery practice aligns with culturally sensitive and patient-centered care models (Novia et al., 2022; Yuliani et al., 2019). Midwifery curricula should encourage students to appreciate traditional knowledge systems and evaluate them through the lens of modern scientific inquiry. Community engagement strategies, where midwives collaborate with teachers, parents, and local leaders to disseminate health information, can amplify the reach and impact of reproductive health promotion (Alenezi et al., 2021; Sun et al., 2021).

Encouraging Research Literacy and Critical Thinking. Midwifery students must be equipped with skills in research literacy and critical appraisal to assess the safety and efficacy of herbal interventions. The findings from this study offer a practical case for teaching students how to design, implement, and interpret intervention research (Polit & Beck, 2021). By engaging with current literature and ongoing scientific debates, midwives can make informed clinical decisions and provide up-to-date recommendations to their patients (Kaur et al., 2022; Bradshaw et al., 2022).

Supporting Evidence-Based Practice in Clinical Settings. As healthcare increasingly emphasizes evidence-based practice, the adoption of interventions like soursop leaf decoction should be guided by robust clinical data. Midwifery education should therefore prioritize training in the collection and analysis of patient outcomes, as well as in the documentation of adverse effects and contraindications. This approach not only enhances patient safety but also contributes to the ongoing refinement of clinical guidelines for

managing vaginal infections (Saha et al., 2020; Modarresi et al., 2022). Addressing the Limitations of Standard Pharmacological Treatments. The emergence of antimicrobial resistance and the risk of side effects from conventional drugs like metronidazole and clindamycin have highlighted the need for alternative, non-pharmacological interventions (Workowski et al., 2021; Abdel-Rahman et al., 2022). Herbal remedies, when scientifically validated, can serve as adjuncts or alternatives in the clinical management of vaginal discharge, thus reducing the reliance on antibiotics and preserving their efficacy for more severe infections (Sun et al., 2021; Alabi et al., 2020). Midwives must be able to explain the benefits and limitations of both approaches to patients and help them make informed choices.

Enhancing Preventive Care and Health Promotion. The research also emphasizes the preventive potential of regular genital hygiene and accessible herbal interventions in reducing the incidence of vaginal discharge. Midwifery students should be taught the importance of preventive education, early intervention, and regular monitoring, which can reduce complications and long-term reproductive morbidity (Mania-Pramanik et al., 2009; Shiferaw et al., 2020). Promoting the use of natural products that are safe, cost-effective, and accepted by the community can form an integral part of school and community health programs. Policy Implications and Integration into National Health Strategies. At the policy level, these findings could inform updates to adolescent reproductive health guidelines issued by ministries of health and education. Incorporating scientifically validated herbal interventions into standard protocols can expand the repertoire of midwives and school health nurses, especially in areas with limited access to pharmaceuticals (Abdel-Rahman et al., 2022; Mousa et al., 2021). Policymakers are encouraged to support further research, training, and dissemination of evidence-based alternative therapies for reproductive health.

## CONCLUSION

The primary objective of this study was to assess the effectiveness of soursop leaf (Annona muricata) decoction wash in reducing the incidence and severity of pathological vaginal discharge among tenth-grade female students at SMA An-Nur Bululawang. The findings revealed a substantial improvement post-intervention, with 96% of participants reporting no pathological discharge and a significant reduction in mean discharge scores, as confirmed by statistical analysis (Wilcoxon Signed-Rank Test, $p = 0.000$). This research highlights the promising role of evidence-based, natural interventions—specifically, soursop leaf decoction—as a safe and accessible alternative or adjunct to conventional pharmacological treatments for adolescent reproductive health issues. By integrating such interventions into midwifery education and reproductive health promotion, this study contributes not only to the scientific literature but also to practical health strategies, empowering midwives and adolescents with culturally relevant, preventive, and therapeutic options for managing vaginal health.

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